Proposed Data Reduction Rules and Data Integration for BERA

1. Duplicates (Field splits)

A. **BERA**: No change from Round 2 Report (R2R) (see 1B)

B. **R2R ERA:** Field splits are averaged according to the following rules, as specified in the Guidelines for Data Averaging and Treatment of Nondetected Values for the Round 1 Database (Kennedy/Jenks et al. 2004):

- If all results are detected (D), average all D

- If all results are not detected (ND), report the min DL and flag result as ND (U-qualified)

- If results are a mix of D and ND, report the D value

2. Replicates

A. **BERA:** No change from R2R (see 2B)

B. **R2R ERA:** Rules are dependent on usage:

For Data Analysis & Reporting - When calculating a mean or a UCL, and when reporting data in general, replicates are included in the dataset as discrete samples, due to the spatial separation of replicate sampling locations (Note: the majority of the replicate samples are within 10 to 20 feet of each other; about 10 percent of the samples are widely separated)

For Spatial Analysis - When generating Thiessen polygons (or any other task which spatially weights data), replicates with unique coordinates are included as separate samples. Data associated with the first sample is used for replicates that have the same coordinates (the second or third replicate is excluded).

3. Determining the presence of an individual analyte for inclusion in the BERA and for the purpose of calculating chemical group sums

A. **BERA:** No change from R2R (see 3B)

B. **R2R ERA:** For each of the following media, an analyte is considered to be present if it is detected at least once within the study area. Otherwise, the analyte is treated as not present.

- Surface water

- Transition zone water

- Sediment

- Tissue

  a) All fish species are evaluated collectively

  b) All benthic species are evaluated collectively

4. Summing of Analytes for Chemical Groups (excluding TEQs)

A. **BERA:** No change from R2R (see 4B)

B. **R2R ERA:**

- If at least one group component for a given sample is detected, sum the following:

  a) If an analyte is detected (D), use D value in sum

  b) If an analyte is not detected (ND), but determined to be present (per 3B), use ½ DL in sum

    c) If an analyte is ND and determined not to be present (per 3B), use 0 in sum

- If all analytes for a chemical group are ND, report max DL and flag result as ND (U-qualified)

5. Summing of Analytes for TEQs

A. BERA:

- If at least one TEQ constituent for a given sample is detected, sum the following:

    a) If an analyte is detected (D), use D multiplied by the TEF in the sum

    b) If an analyte is not detected (ND), but determined to be present (per 3B), use ½ DL multiplied by the TEF in the sum

    c) If an analyte is ND, and determined not to be present (per 3B), use 0 in sum

- If all analytes used to create a TEQ are ND, report the max toxicity-weighted DL as the TEQ, and flag result as ND (U-qualified)

B. R2R ERA:

- If at least one TEQ constituent for a given sample is detected, sum the following:

    a) If an analyte is D, use D multiplied by the TEF in the sum

    b) If an analyte is ND, use ½ DL multiplied by the TEF in the sum, including those analytes determined not to be present (per 3B)

- If all analytes used to create a TEQ are ND, sum all ½ DLs (each multiplied by the respective TEF), and flag result as ND (U-qualified)

6. TEFs

A. **BERA:** Use 1998 WHO TEFs for fish and birds, and 2005 WHO TEFs for mammals

B. **R2R ERA:** Use 1998 WHO TEFs for fish, birds, and mammals

7. Handling of surface water collected by different methods

A. **BERA** No change from R2R (see 7B)

B. **R2R ERA:**

- For comparison to criteria based on totals, combine XAD-column and XAD-filter results as follows:

    o If both D, sum

    o If 1 ND, 1 D, use D value

    o If both ND, use max ND

- Treat XAD and peristaltic samples as separate samples

8. Minimum number of samples for ProUCL

A. **BERA:** For datasets with >5 detects, calculate 95% UCL using ProUCL 4.0. For datasets with 5 or fewer detects, use maximum value instead of 95% UCL for EPC.

- Non-detect values are entered into ProUCL 4.0 as the full reporting limit, and are flagged as a non-detect value before calculations are done. Once the UCLs have been calculated, ProUCL output provides a variety of UCL statistics and recommends the most appropriate statistic for use. The user does not choose the UCL, but rather relies on the recommendation made by ProUCL 4.0, except when the dataset contains 5 or fewer detects as described above.

B. **R2R ERA:** For datasets with >3 samples, calculate 95% UCL using ProUCL 3.0. For datasets with 3 or fewer samples, use maximum value instead of 95% UCL for EPC.

9. Organic carbon normalization

A. **BERA:** For each organic analyte in the sediment dataset, calculate the organic carbon-normalized (OC-norm) concentration as follows:

- For all calculations, use the fractional organic carbon content, f_{oc} (TOC%/100)

- OC-normalized values are calculated as C_{dw}/f_{oc}

- For higher TOC values (>4.0%), evaluate individual samples for possible anthropogenic contributions to organic carbon (e.g., woodwaste, petroleum, NAPLs or sewage) that may confound partitioning assumptions.

- For TOC < 0.2% or high values with contribution from anthropogenic wastes (see previous bullet), no OC-normalized value will be calculated. In these few cases, sample data will be evaluated on a dry weight basis only

- For samples without TOC data, the value will be either calculated using a regression equation based on site-specific TOC and grainsize (as percent fines) or extrapolating from the nearest available sample data. An OC-normalized concentration will then be calculated using the rules provided above.

B. **R2R ERA:** For each organic analyte in the sediment dataset, calculate the organic carbon-normalized (OC-norm) concentration using the formula C_{dw}/f_{oc}, where C_{dw} is the dry-weight concentration and f_{oc} is the fractional organic carbon content (TOC%/100).

10. References

Kennedy/Jenks, Integral, Windward. 2004. Portland Harbor RI/FS technical memorandum: Guidelines for data reporting, data averaging, and treatment of non-detected values for the Round 1 database. Kennedy/Jenks Consultants, Portland, OR; Integral Consulting, Inc., Bellevue, WA; Windward Environmental LLC, Seattle, WA.